Claims

1. Method for measuring the concentration or change in concentration of a redox-active substance as a mediator in a molecular-biological detection system, in which as a result of application of suitable potentials to a working electrode a reduction process or an oxidation process takes place as a redox reaction, having the following measures:

- the potential of the working electrode is pulsed, and measuring phases and also relaxation phases are formed alternately;
- in this connection the measuring-phase pulse lengths are selected so that towards the end of the pulse the capacitive current is small in comparison with the Faraday current; and
- the relaxation-phase pulse lengths are selected so that towards the end of the pulse the concentration gradient is relaxed so that at the beginning of the following measuring phase the change in concentration of the mediator, brought about by the consumption of the mediator by the measurement itself, is reversed to the greatest possible extent.

2. Method according to claim 1, characterised in that the current measured at the end of the measuring phase forms the measuring signal.

3. Method according to claim 1, characterised in that when measuring oxidation currents an adequate reduction potential is set during the relaxation phase and the species oxidized during the measuring phase and still located in front of the electrode are reduced again (so-called pulsed redox-cycling).

4. Method according to claim 1, characterised in that when measuring reduction currents an adequate oxidation potential is set during the relaxation phase and the species reduced during the measuring phase and still located in front of the electrode are oxidized again (so-called pulsed redox-cycling).

5. Method according to claim 3 or claim 4, characterised in that the repetition rate for the pulsed redox-cycling amounts to at least 1/10 Hz.

6. Method according to one of claims 2 to 5, characterised in that the pulsed redox-cycling is carried out with predeterminable pulse shapes, preferably with a rectangular, triangular or sinusoidal course.

7. Method according to one of the preceding claims, characterised in that the relaxation phase is at least as long as the measuring phase.

8. Method according to claim 7, characterised in that the relaxation phase is considerably longer than the measuring phase.

9. Method according to claim 8, characterised in that with a repetition rate of 1 Hz, the pulse lengths of the measuring phases amount to 100 to 300 ms, preferably 250 ms, and the relaxation phase amounts to between 700 and 900 ms, preferably 750 ms.

10. Method according to one of the preceding claims, characterised in that the potentials are selected so that the reactions occur in the diffusion limiting current range.

11. Device for carrying out the measuring method according to claim 1 or one of claims 2 to 10, with a facility for producing potentials that can be predetermined with respect to time and are variable electrically, and with a transducer array (100).

12. Device for [*sic*] according to claim 11, characterised in that the transducer array (100) consists of at least one flexible planar metal substrate (1), arranged on which there is at least one flexible insulator (2) with a fixed connection between the metal surface and insulator surface, with the metal substrate being structured in such a way that metal regions (10_i) exist that are electrically insulated from each other, and with the insulator (2) that is located on the metal substrate (1) being structured in such a way that cavities (3_i) with open metal surfaces (101_i - *sic*) are defined in the insulator (2), with the metal regions (10_i) being contactable from the side (12_i) that is remote from or lies opposite the sensor area (11_i).

13. Device according to claim 11, characterised in that the transducer array (100) comprises areal electrodes, whose smallest extent is greater than typical diffusion lengths.

14. Device according to claim 13, characterised in that the areal electrodes have an extent of at least 30 µm, preferably 50 µm.

15. Device according to claim 14, characterised in that the areal electrodes are formed using thin-film technology on a non-conductive, rigid substrate.

16. Device according to claim 15, characterised in that the rigid substrate is silicon.

17. Device according to claim 16, characterised in that an insulator is provided on the substrate.

18. Device according to claim 11, characterised in that the facility for producing predeterminable electric potentials is a potentiostat (5).

19. Device according to claim 18, characterised in that associated with the potentiostat (5) for producing pulsed electric potentials there is a pulse generator (6).

20. Device according to claim 19, characterised in that operational amplifiers (7, 7') and a defined measuring resistor (8) are provided in the potentiostat (5).